

Carbon Markets: Have They Worked for Africa?

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ABSTRACT

Carbon markets are an essential mechanism for the successful implementation of the international climate change regime. The design of the flexible mechanisms under the Kyoto protocol is the principle driver of the development of such markets, especially in developing countries. However, developing countries, particularly those in Sub-Saharan Africa (SSA), remain marginalized in global carbon markets despite significant mitigation opportunities in agriculture and forestry. Moreover, Africa has significant potential for renewable energy, a key driver of the carbon emissions reduction. Despite all this, Africa's share of the carbon markets remains relatively low. It is puzzling therefore that the proponents of carbon trading continue to tout the benefits it offers to the poor in Africa, in the face of mounting evidence to the contrary.

Keyword: Climate change; Carbon markets; Carbon emissions; renewable energy

1. INTRODUCTION

Global Carbon markets with international carbon offsets have been designed to channel carbon finance for climate change management to poor and developing countries. With climate change becoming more of a global economic threat, scientists, economists and policy makers are all in agreement that carbon emissions have to be drastically reduced to avoid the worst impacts of global warming (Somerville, 2012; IPCC, 2014; Gore, 2007). Global carbon markets, the trading of emission reduction permits, have become a key response mechanism for mitigating climate change. Carbon markets have become a powerful policy instrument to leverage both public and private capital for green growth, including activities that are key to Africa's growth such as sustainable agriculture and renewable energy generation. By putting a price on carbon, carbon markets help to stimulate abatement and technology transfer and drive investment in low carbon technologies and services (Labatt and White, 2007; Stern, 2008).

Within less than a decade, global carbon trading has rapidly expanded in volume, value and scope (Ervine, 2014). The number of Clean Development Mechanism (CDM) projects, which is meant for developing clean energy projects in developing countries, stands at over 8475 projects across the world. The total volume of Certified Emission Reduction (CER) permits also increased to over 1.7 billion (UNEP, 2016). In the voluntary carbon markets, companies,

governments, and individuals voluntarily spent just under \$4.5 billion on conservation and clean energy over the past decade by purchasing nearly 1 billion carbon offsets (Ecosystems Marketplace, 2016). The voluntary markets have served as the testing ground for compliance carbon pricing programs all over the globe (Climate Policy Initiative, 2015).

Carbon markets have been rapidly adopted as policy solutions to climate change, since the ratification of the Kyoto protocol in 1997 and its subsequent coming to force in 2005 (Lohmann & Sexton, 2010). The Intergovernmental Panel on Climate Change (IPCC) has made it unequivocally clear that carbon emissions must be regulated to prevent further warming of the global climate system (IPCC, 2014). The trading of emission reduction permits, through these markets, have and will continue to play an important role in regulating carbon emissions (Spaargaren, 2011). Niemack (2009) and Chevalier (2009) also agree that carbon markets have provided effective international market-based mechanisms and regulatory-based policies for developed countries to meet their emissions targets, while encouraging developing countries to participate voluntarily in mitigation activities for reducing emissions. However, under the Paris climate agreement of 2015, both developed and developing countries are expected to provide their intended nationally determined contributions (INDCs), which erodes the voluntary participation of the developing countries, extending financial responsibility of emission reductions to them as well (Newell & Bulkeley, 2016)

Africa has gained few benefits from economic globalization, and the continent's economies continue to depend on few primary goods whose prices are determined externally. This unjust allocation of resources, access, and development extends to climate policies in that Africa's interests have remained peripheral to their implementation (Mulugeta, 2010). The African continent is highly endowed with abundant natural/renewable sources for more sustainable energy, which is key to developing clean energy projects, vital to mitigation of climate change. These abundant natural resources present new opportunities for Africa to derive economic and developmental benefit through their exploitation. Therefore, by placing a market value on activities that can reduce GHG emissions, the carbon market is increasingly being used as a tool to finance this transformation in Africa. However, the extent to which Africa has benefitted from the carbon market, in spite of its renewable energy potential, is highly in doubt (Pfeiffer and Stiles, 2009; Walker et al, 2008).

The growth of various carbon markets and their contribution to climate change mitigation has not been felt much in Africa. African countries, with all their climate mitigation potential, have remained marginalized from these expanding markets. Out of more than USD 1.095 trillion worth of climate funds that has been mobilized through various carbon funds, countries and global organizations to combat climate change, only less than 10 % has come to Africa (World Bank, 2012). Moreover, Africa's share of Clean Development Mechanism (CDM) projects has remained low, at less than 3% of all projects, compared with over 60% of projects in China alone (IPCC, 2013).

The inflows of carbon finance to poor and developing countries, especially those in Africa, have also been low and less than steady (CPI, 2015). This, despite the fact that these poor and developing countries are more vulnerable to climate change due to lack of adequate infrastructure and support mechanisms to adapt efficiently. Africa has remained marginal to the carbon market, and the carbon market has been irrelevant to the continent's efforts to tackle climate change. Though pledges of over \$13.5 trillion have been made by the developed nations, they fall short of \$16.5 trillion needed to limit the global warming to 2 degrees (World Bank, 2011). However, the biggest challenge remains how poor and developing countries,

especially in Africa, would tap to these funds. Moreover, these pledges by the developed world, have remained as just pledges, with little or no finance forthcoming (Haïtes, 2011).

The high level of expectations attached to carbon finance in Africa has not yet been matched with an equivalent level of achievement, particularly with regards to delivery of CERs and their associated revenues (Pfeifer and Stiles, 2009; Muzee, 2011). Many researchers and policy makers (e.g. Lyons & Westoby, 2014; UNEP, 2011; Beck and Martinot, 2004) have advanced several reasons why Africa has lagged behind in the carbon markets including; prohibitive costs and lack of investment capital to develop CDM projects to completion; lack of private investors for afforestation and reforestation; uncertain markets for emission reductions; the complexity of CDM methodology and lack of technical knowhow and lack of institutional capacity in Africa for implementing all the requirements of CDM projects.

Carbon markets have also been touted as having the potential of making powerful actors such as financiers, to create new cycles of investment, profits and growth, which can possibly lead to the formation of a political coalition combining financiers with environmentalists (Paterson 2011). However they have been faulted because of among other things; lack of proper regulations in the carbon markets; inability of the markets to bring serious climate mitigation benefits so far; marginalization of some poor and developing countries and the misuse of the markets by certain powerful groups such as financiers (Wang and Song, 2009). Ervine (2014) also point out that market-based carbon finance has remained highly volatile given its heavy dependence on conditions in the broader global carbon market which remains in the throes of a devastating crisis, earning carbon the distinction of 2011s worst performing global commodity.

The uncertainty over the extension of the Kyoto Protocol post 2012, plus the carbon crisis of 2011, created a cloud of uncertainty over the performance of the carbon markets. However, Conference of Parties (COP) 18 at Doha amended the protocol to establish a second commitment period, giving a new lease of life to the carbon markets. The Paris Agreement on climate change of December 2015 sent a strong signal for ambitious and sustained global climate action. By allowing countries to use international carbon markets to meet their commitments, the Agreement has recognized the cost-effectiveness potential of market-based solutions to climate change. Over half of the parties to the United Nations Framework Convention on Climate Change (UNFCCC) have indicated they plan to use or consider using international markets in their compliance strategies. African countries have also not been left behind in showing their commitment to the new climate deal (Tay, 2015; UNFCCC, 2015).

2. CARBON MARKETS IN AFRICA: CURRENT STATE OF PLAY

Contemporary carbon markets, especially those with international offsets, have been regarded as global institutions with high potential for mitigating anthropogenic climate change. These markets have developed out of the desire by industrialized countries to minimize their cost of compliance with legally binding emission reduction targets under the United Nations Kyoto Protocol (Ervine, 2014). Carbon trading is also premised on the recognition that it is cheaper for some countries to lower emissions than others. All the efforts and resources spent in the carbon markets are therefore to meet current and future costs of climate change mitigation (Halimanjaya, 2016).

Many African countries have minimally participated in either or both of the two main carbon markets: the regulatory compliance carbon market and the voluntary carbon market. The

compliance market, regulated by mandatory national, regional or international carbon reduction regimes, is by far the biggest carbon offsets market, with over 80% of all carbon trading taking place through the three Kyoto Protocol mechanisms: Clean Development Mechanism (CDM), Joint Implementation (JI) and the Emission Trading System (ETS) (UNFCCC, 2007). The extension of the protocol to 2019 at COP 18 at Doha, Qatar meant even more opportunities have been availed for poor and developing countries to sell their carbon credits (UNFCCC, 2013). However, the Paris Climate agreement in 2015 fundamentally altered the provisions of the protocol as to developing and developed countries, though it recognizes the use of carbon markets by countries using internationally transferred mitigation outcomes to implement their intended Nationally Determined Contributions (UNFCCC, 2015).

The threat of governmental regulation and compliance targets for non- Kyoto companies led to the growth of voluntary market, which have served as the testing ground for compliance carbon pricing programs all over the globe (Hamilton et al., 2010a). The Verified Emission Reductions (VERs) traded in the voluntary carbon markets apply to companies, individuals, and other entities that are not subject to mandatory limits, yet wish to offset or neutralize their carbon footprints (Sabitova, 2012). Because of the rigorous CDM procedures, many project developers in developing countries, especially in Africa, pursue the developments of carbon credits for sale in the voluntary markets. However, evidence shows that Africa's participation in these markets is also very low, relative to other continents, especially Asia and South America (Mulugeta, 2012). The Climate Policy Initiative (2015) estimates that only less than one percent of the voluntary carbon finance has come to Africa.

While the CDM presents a huge potential for Africa, the statistics show that the mechanism has not taken off in the Africa Continent as much as it has in others continents, even if important growth trends have been observed in recent years. Africa's participation in the compliance markets has been relatively less impressive. Of the total 8814 projects registered by CDM by 2016, only 261 are from Africa, a mere 3.0%, against a total population of over 900 million, a small fraction compared to Latin America and Asia Pacific that hold 95%. African projects are expected to generate only 84 million CERs, against Latin America 400 million CERs and Asia Pacific's 1.8 billion CERs (UNEP, 2016). Moreover, to date no country in sub-Saharan Africa has put in place a price on carbon. Despite the abundance of natural resources and the potential for large emissions reduction, Africa has performed poorly in the compliance market. African countries struggle to secure conventional finance to initiate CDMs, and lack adequate capacity to deal with the numerous technical and procedural challenges (Redmond & Convery, 2015).

Africa's share of voluntary carbon markets is also still small and sits at a mere 1% compared to the rest of the world - a huge shortfall considering the potential benefits of carbon offset revenue for sustainable development on the continent. However, many African countries, including Kenya, Ghana, Mozambique, Uganda and the Democratic Republic of Congo have seen a surge in international demand for offset for projects in the voluntary carbon markets such as delivering clean cook stoves and water purification devices, which are likely to increase participation in these markets (Bloomberg Energy, 2013).

While African carbon projects development has historically lagged behind its Asian and Latin American counterparts, total offsets transacted have steadily risen over the years. By 2015, buyers had contracted a total of 45.1 MtCO₂e from the continent, of which 54% was transacted in the last three years alone. African offset sales remained stable last year at 6.7 MtCO₂e, just slightly less than 2014's volume. The majority of the volume originated from forestry or cookstoves projects as buyers sought to support emissions reductions that contributed to low-deforestation and sustainable development on the continent (Ecosystems Marketplace,

2016). Though average prices decreased 9% to \$5.2/tonne in the voluntary markets, buyers paid more for African offsets than those from any other region except Oceania, for a total value of \$34.7 million. Buyers (whether end-users or retailers) often contracted directly with project developers: 54% of Africa's 2015 offset transactions represented primary market demand while the remaining 46% of tonnes were resold by secondary market actors. However, the momentum of the carbon markets was not matched by the growth in compliance markets (Ecosystems Marketplace, 2016; CPI, 2015).

Overall, the high level of expectations attached to carbon markets in Africa has not yet been matched with an equivalent level of achievement, particularly with regards to delivery of CERs and their associated revenues (Gray, 2011; Carbon Africa, 2012). For instance, of the 13 recognized regional carbon trading schemes, none is in Africa. The recently launched Africa Carbon Credits Exchange in Lusaka Zambia is not yet fully operational and lacks a clear system of trading carbon credits (The World Carbon Market Database, 2016). This is despite the continent's endowment with huge renewable energy prospects such as the tropical sunny climate, huge geothermal prospects, huge rivers and windy conditions among others, which are ideal for carbon credits generation (Yadoo and Heather, 2012; Nedbank Capital, 2012; World Bank, 2010). It is therefore apparent that Africa makes very little use of the carbon finance mechanisms on offer for investment in its low carbon sector, such as the abundant renewables.

3. PITFALLS: WHY HAS AFRICA FAILED IN THE CARBON MARKETS

Several reasons have been advanced as to why Africa, despite her mitigation potential, has failed to take off in the international carbon markets. Many scholars (Mulugeta, 2012; Pfeifer and Stiles, 2009; Hermwille, 2015) have all blamed this on uncoordinated attempts, regulatory and policy challenges. They argue that the implementation thereof and global connections can make it a challenge for carbon trading to work. There have also been circumstances under which baseline-and-credit CDM schemes have resulted in the maltreatment of indigenous peoples and their environment. Others, such as Capoor & Ambrosi (2009) argue that cases of trade fraud and accounting discrepancies have hindered the development of these markets in Africa, with constraints ranging from the structure of the carbon markets themselves to Africa's own unique situation.

The perennial challenges of doing business in Africa has also affected its access to international carbon markets. Although many companies from the developed world are setting their sights on the continent as a new frontier for business, Africa remains a tricky terrain (Tchamyou, 2016). Adequate legal and institutional frameworks are lacking or are weak (Mulugeta, 2012). Barriers to trade and investment, which may inhibit access to new technologies, the high investment risks in some African countries, have also resulted in potentially lower prices for CERs; and the overall policy framework in potential host countries, which may include policies not conducive to CDM, e.g. high levels of taxation, high interest rates, lack of support for foreign direct investment and uncertainties around fiscal policies formulated (ADB, 2015; Pye et al, 2009).

The exclusion of key projects types within the two sectors in which Africa has the greatest potential; agricultural soil carbon sequestration and avoided deforestation from the CDM, has dealt Africa a heavy blow as far as carbon markets are concerned (Bryan et al, 2010). Under the current rules, project activities implemented in agricultural, forestry and other land-uses (AFOLU) are limited to narrowly defined afforestation/reforestation activities and a few activities involving GHG reductions from agricultural waste products. While there is increasing recognition of the importance of the forestry and agricultural sectors in general, including

current discussions around Reducing Emissions from Deforestation and Degradation (REDD), Africa needs to develop and implement its own climate and carbon finance strategy, built on the recognition that the continent can contribute most effectively to mitigating climate change by promoting sustain-able land use practices (Seeberg-Elverfeldt, 2010).

The market complexities of accessing CDM have also been a big disadvantage for Africa. The Clean Development Mechanism has been criticized for its unequal regional distribution of projects, lack of concern about environmental integrity and actual technology transfer, complex governance procedures, and questions about its contribution to sustainable development (Gray, 2011). The stringent regulatory framework and lengthy time period for verifying methodology and validating CER issuances act as barriers to CDM market entry, particularly for Africa, as these factors influence the price of CERs (Tay, 2015). However, for carbon trading to remain credible, and for CDM projects to provide genuine emissions reductions (as well as technology transfer), stringent verification and validation procedures must be adhered to. Nevertheless, this has contributed a great deal too low level of carbon trading in Africa (Bryan et al, 2010; ADB, 2015).

Financing has also been cited as a major barrier to renewable energy and energy efficiency (RE/EE) projects, which deliver carbon emission reductions and sustainable development benefits to low developed countries in Africa (McLellan, 2015). Renewable energy projects require significant capital investments, before they can start producing power. Several components of this financial barrier have also been identified, including lack of financial capacity from project developers and poor financial packaging of projects and a lack of knowledge on how to sustain revenue streams from carbon credits, which are new to most of these players, and present largely unexplored challenges and opportunities. Also, a large portion of the outputs from these projects, the sustainable development characteristics, have a value which is not usually recognized by financiers, making it difficult for developers to access capital (Luxmore et al, 2013).

There are also several constraints specific to Africa that hinders the growth of carbon markets. For example, infrastructure development in Africa is very poor, especially in the rural areas. Further, penetration of information and technologies among African populace, especially in rural areas, where majority of the population live, has been painfully slow (Garrone et al, 2011). These, combined with low capacity and lack of awareness about the potential of carbon markets, particularly the CDM, has created a bigger gap in accessing these markets. Though it varies from country to country, it is a problem even in the more industrialized African countries, e.g. South Africa, Nigeria, and Egypt (Luxmore et al, 2013). It also made Africa miss the opportunity to capitalize on the first commitment period of the Kyoto Protocol (UNEP, 2015). However, efforts put in place by UNFCCC have seen levels of awareness increase in many African countries. In fact, 47 out of 53 African countries had met their Nationally Determined Contributions by October of 2015, way before the start of COP 21 in Paris in November of 2015 (IPCC, 2016).

In spite of all these challenges, the outlook is rosy on the African continent which is increasingly attracting investors' attention. New initiatives to boost clean development in Africa are coming on stream. For example, the United Nations launched in 2016 a new interest-free loan scheme, capped at \$100,000, to help developing countries pre-fund their projects. At the same time, the Center for Disease Control (CDC) Climate, in partnership with the West African Development Bank (WADB) and the French Development Agency (AFD), has announced the launch of a Carbon Fund dedicated to Africa. With starting capital of €45 million, it includes a mechanism to assist operators with the technical aspects of setting up their

projects. It is hoped that these initiatives will drive a genuinely green dynamic process in Africa and enable the continent to make up some lost time in the field of clean energies. Further, a range of bilateral funding mechanisms have emerged to support the growth of the carbon market in Africa. One of the largest of these programmes is the Swedish Energy Agency's 'Institutional Support for Capacity Building Programme for CDM' programme. The programme has offered 'capacity building' for potential project owners, financial and legal institutions, and governmental agencies in Kenya, Tanzania and Uganda, and is also backing the creation of new CDM projects, which the Swedish government will then use to offset its emissions.

4. POSSIBILITIES OF INCREASING CARBON TRADING IN AFRICA

The huge climate mitigation potential that Africa has could be tapped to increase carbon trading in the continent. There are also potential advantages of establishing a local carbon market in Africa. A local emissions trading system could create a system that is more flexible, more affordable and better suited to the African environment (Shames & Scherr, 2010) and also encourage local investment in African projects, create transparency and generate trading volumes (Bryan et al, 2010). An increase in CDM projects would in turn create more jobs, stimulate sustainable development and assist developed (as well as emerging economy) countries in meeting their respective commitments to climate change mitigation (Environmental Defense Fund, 2015; Reddy, 2011; Mulugeta, 2012). The establishment of such a market in Africa has been met with many challenges (UNFCCC, 2007). To unleash the huge potential for mitigation in Africa, carbon markets should be expanded to include projects related to agriculture, forestry and other land uses (AFOLU). Currently, the only land use, land-use change and forestry (LULUCF) practices accepted by the regulatory market are afforestation and reforestation (AR). Soil carbon sequestration projects and projects that reduce emissions from agricultural soils, such as changes in rice management practices, are excluded (UNFCCC, 2007). Land use and forestry sector are key to increasing emission reductions in the continent, where majority of the population depend on agriculture. There are also many areas where emissions can be avoided through ceasing of current land use activities (Bryan et al, 2010).

Africa is also endowed with enormous renewable energy resources in form of a tropical sunny climate, huge geothermal prospects, huge rivers and windy conditions all suitable for significant renewable energy generation (Abdulla & Jeanty, 2011). Estimates from the African Development bank show that Africa can generate an additional 10 terawatts of solar energy, 1,300 gigawatts of wind power, and 15GW of geothermal potential. Such potential, if fully exploited, can solve Africa's energy problems and even leave room for power exports outside the continent (Yadoo and Heather, 2012). However, only a very small proportion of these renewable energy prospects have currently been tapped. For example, only less than 1% of Africa's geothermal potential has been exploited (Bloomberg Energy, 2015). With most of the CDM projects leaning towards renewable energy, exploitation of this potential would create significant increase in carbon market activity in the continent. Further, using clean, low-carbon energy is a more effective metric that addresses emissions reductions and at the same time promotes sustainable development, for a continent that is poorly developed (Kippra, 2011, 2005; Linares & Rio, 2014).

Climate Smart Agriculture (CSA) or sustainable agriculture is yet another area where Africa is potentially endowed. The concept of sustainable agriculture endeavours to reduce chemical inputs and energy use in farming systems, in order to minimize environmental damage and to ensure longer term productivity (Obiora and Madukwe, 2011). It helps to counteract climate

change by restoring soil organic matter content as well as reducing soil erosion and improving soil physical structure. Sustainable agriculture practices such as organic farming can mitigate climate change as it uses less fossil fuel based inputs and has a better carbon footprint than conventional agricultural practices (Nyasimi et al, 2014). But climate smart agriculture (CSA) has several factors that make it unattractive to African populace. There is a general lack of knowledge on sustainable agricultural practices in Africa (Arslan et al, 2015) while capital and capacity constraints (Campbell et al, 2014) play a major role in limiting African farmers to old agricultural practices. Moreover, a lack of recognition of climate smart agriculture in international climate change negotiations and gaps in available carbon methodologies (Atela, 2012) has also discouraged carbon markets participation in a continent where agriculture is the mainstay of many economies. Policies for agricultural carbon finance are still under negotiation globally and nationally, and are subject to a number of operational hurdles and conflicting interests (Beddington et al, 2012).

Africa could also make significant reductions in carbon emissions through avoided deforestation, as it straddles the tropics. Some studies (Mbow, 2013; Leach & Scoones, 2013), shows that 93 per cent of the mitigation potential in tropical regions over the short term is related to avoided deforestation. Africa has an estimated 650m hectares (1.605bn acres) of untouched forest, almost a fifth of the world's stock. These carbon sinks can suck in 1.2bn tonnes of carbon dioxide a year about half the carbon dioxide emissions from all the homes in the United States of America (ADB, 2015). And this, they can do, even under the threat of deforestation and forest degradation. If Africa can preserve its forests, for instance in the Congo basin, it can absorb more of its own and the world's carbon dioxide. Africa's estimated emission reduction potential of 1,348 MtCO_{2e} per year accounts for 23 per cent of the global total for the forestry sector (Forest Trends, 2016).

Many African countries also have limited capacity on the legal and regulatory aspects of carbon trading and the Clean Development Mechanism (Burian & Arens, 2014). Regulatory uncertainty and inefficiencies have also contributed to the contraction of CDM in Africa, especially post 2012. To increase carbon market investment, there is need to strengthen domestic legal and regulatory frameworks in many African countries. Further, a review of the existing contractual structures for CDM/carbon market investment transactions is needed and also a mechanism that could incorporate international and domestic legal issues into existing and new CDM implementation structures (Silver, 2015). Moreover, an enhancement of regulatory carbon trading regimes is also necessary, if Africa is to benefit from the next phase of carbon markets, as expected under the Paris 2015 climate agreement (UNFCCC, 2016). It is expected that existing programs like the World Bank's Carbon Finance Africa Assist (CF-Assist) and the UNEP's Capacity Development for CDM (CD4CDM) project would increase their support to African Designated National Agencies (DNA), in order for them to strengthen their capacity to monitor and evaluate the sustainability of CDM projects and other carbon market activities.

5. CARBON MARKETS BEYOND PARIS 2015: WHICH WAY AFRICA?

Parties to the U.N. Framework Convention on Climate Change (UNFCCC) reached a landmark agreement on December 12 in Paris, which fundamentally charts a new course in the two-decade-old global climate effort. This practically changed the composition and functioning of the global carbon markets. Whereas parties to the convention deliberately avoided the use of the word "carbon markets" due to resistance from some countries, the agreement recognizes

the use of carbon markets by countries using internationally transferred mitigation outcomes to implement their Intended Nationally Determined Contributions (INDCs). The agreement also establishes a new mechanism to succeed the Kyoto Protocol's Clean Development Mechanism, which generates tradable emission offsets (UNFCCC, 2015). Nhamo & Nhamo (2016) report that even though the Paris Agreement is not what everybody wanted, there is every reason to acknowledge its success, compared to the failed COP15 of Copenhagen in 2009, where no binding agreement came from the proceedings.

For Africa, the sweet spot in the deal is an agreement to allocate money to the adaptation and climate mitigation needs of developing countries. African negotiators had urged rich countries to build on the promise by developed countries to ramp up climate financing by \$100 billion by 2020 for developing countries, in line with the 2012 Cancun commitment. They got their wish, plus more, because the Paris deal stipulates that the \$100 billion commitment will be revised upward from 2025 (Redmond & Convery, 2015). However, many developing countries remain skeptical of the endless financial promises. Since Gleneagles in 2005, when \$50 billion in aid was promised by the G8, \$100 billion per annum was promised from Copenhagen's COP15 in 2009, to the scale-up promises of \$100 billion annually from 2015 – developing countries are still waiting for these promises to be met (Nhamo & Nhamo, 2016).

In another move that will be significant for Africa, the agreement also altered the provisions of the protocol as to developing and developed countries. According to the deal, however, while the rich countries will dig deeper into their pockets, developing countries are required to make some contribution too. The second Africa Adaptation Gap Report of the United Nations Environment Programme (UNEP) recommends that African countries must raise up to \$3 billion per year between 2016 and 2020. Also, given that the climate deal hammers on the need to restore no fewer than 127 million hectares of degraded land in Africa and Latin America, mostly through agro-ecosystems, the net gain for Africa could be increased agricultural productivity leading to food security, climate adaptation and income and job creation (Munang and Mgende, 2016; ADB, 2016). However, the global adaptation gap remains large and African countries need to mobilize more of domestic finance to meet their adaptation needs. Africa's adaptation funding needs of \$15 billion annually, as estimated by the United Nations Environment Programme to 2020, and the \$50+ billion annually thereafter to 2050 is too large to be met through the never coming developed countries support (Kumamoto & Mills, 2012; UNEP, 2012).

Overall, the consensus is that the Paris Agreement is a win for all. For Africa in particular, it presents a unique opportunity to create and implement strategies that use new approaches and technologies to realize the dream of an environmentally sustainable and economically flourishing continent. With declining global costs of investing in renewable energy, Africa is expected to play a significant role in the climate war, by increasing its renewable energy investments and engaging in climate smart agriculture. This is expected, if the Paris Climate agreement hold, to bring more carbon finance to Africa (Tay, 2015).

The implementation of the Paris Agreement is, like all other outcomes of COPs, fraught with risks. The rules for a trading mechanism to succeed the Kyoto based CDM where to be enacted in the next meeting i.e. COP 22 that took place in Marrakech, Morocco in November of 2016. However, there was no agreement on the rules to be used, making the much touted agreement start on the wrong footing. Moreover, the fact that the Paris Agreement remains lodged largely in the voluntary space, through the declaration of INDCs and the non-differentiation between

developed and developing countries, is likely to affect the implementation of the agreement adversely (Morales, 2015). It remains to be seen whether Africa will indeed benefit from the new arrangement, having failed to capitalize on the benefits offered under previous agreement, the Kyoto Protocol.

6. CONCLUSION

Africa's potential to participate in the international carbon markets is large, given its ability to contribute to greenhouse gases mitigation. Its potential for renewable energy generation, climate smart agriculture and extensive forestry sector all provide huge GHG mitigation potential. There are also vast areas of low productivity land where management could be altered to increase carbon stocks and create credits. Overcoming the challenges that hinder their exploitation could see Africa increase its ability to tap into the international carbon markets. However, there are certain things that need to be put in place in order for African carbon markets to flourish including filling the financing gaps by leveraging other sources of finance, increasing its investments in renewable energy, catalyzing the African carbon markets by putting in place regulatory systems and increasing public funding for seed capital for carbon reduction projects.

The new Paris climate agreement of 2015, if properly implemented, is set to promote more carbon markets activity, as countries seek to meet their intended nationally determined contributions. In view of this, Africa needs to strengthen its capacity and engage both private and public sectors in project development and implementation, in order to take advantage of the enthusiasm expected in the carbon markets. The new expected carbon mechanism, which could be similar to CDM is likely to simplify participation rules, measurement and enforcement of offset projects, making it more friendly for African countries participation. Africa, with its vulnerability to climate change, must commit itself to low-carbon development pathways with the assistance and support of developed countries in the form of technology and finance, in order to achieve sustainable development.

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